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REMARKS

The present amendment is prepared in accordance with the new revised requirements of 37 C.F.R. § 1.121. A complete listing of all the claims in the application is shown above showing the status of each claim.

Applicants appreciate the thoroughness with which the Examiner has examined the above-identified application. Reconsideration is requested in view of the foregoing amendment.

For purposes of appeal, no claims have been amended, canceled or added in the foregoing amendment.

No new matter has been added.

Drawings

With respect to the drawings, it is applicants' current understanding that the drawings pending in the foregoing application are originally filed Figs. 1-5 and previously submitted Fig. 6, copies of which are attached hereto for clarification purposes only. Again, as previously submitted, claim 11 reciting the limitation of a heater being at the exit nozzle has been canceled, and previously added Fig. 6 is supported by the amended specification reciting that the injector cavity includes an inlet nozzle 50 and a throat region 44 that extends to and becomes the exit nozzle portion 51 whereby the exit nozzle portion maintains the same diameter as the throat region, i.e., exit end 51 has a constant cross section channel down stream of the throat.

Applicants respectfully request that should the Examiner disagree with applicants, that the Examiner contact the undersigned to clarify any discrepancies.

No new matter has been added.

35 USC § 102 Claim Rejections

The Examiner maintains the rejection of claims 1, 3-5, 7-10, 13, 15-17, 19-21, 26-30 under 35 USC 102(b) as being anticipated by Gwyn (U.S. Patent No. 4,397,422). Applicants continue to disagree.

As disclosed in the specification of the foregoing application, the present invention is directed to overcoming the problems and deficiencies associated with chemical vapor deposition (CVD) processes, particularly plasma enhancement (PECVD), by providing an apparatus to atomize and vaporize precursors and dopants in a chemical vapor deposition process more thoroughly and efficiently, and in particular, for flow rates for dopants used in TEOS processes. (Specification, page 1, line 5 to page 4, line 10.)

In so doing, as is recited in independent claims 1, 13 and 28, the invention is directed to an apparatus for delivering a plurality of chemical vapor deposition fluids to a chamber. As recited, all claims are directed to a chemical vapor deposition chamber.

As recited in independent claim 1, the apparatus comprises a chemical vapor deposition chamber having a cavity that includes an inlet nozzle, a throat

region and an exit nozzle. The inlet nozzle has a first diameter, pressure and temperature, and is adapted to receive a carrier fluid. The throat region is connected to the inlet nozzle at a first end. This throat region has a second diameter and pressure that are less than the first diameter and pressure, and is adapted to receive the carrier fluid from the inlet nozzle. The throat region also has a first and a second aperture for injecting, respectively, a first and a second chemical vapor deposition dopant into the throat region for atomization of these dopants by the carrier fluid in the throat region, and the mixing thereof with the carrier fluid. The exit nozzle is connected to the throat region at a second end, and has an exit pressure lower than the second pressure and a third temperature. The exit nozzle has a third diameter greater than the second diameter to allow for a substantial decrease in pressure from the first pressure to the exit pressure and is configured to introduce the mixed atomized first and second chemical vapor deposition dopants and the carrier fluid into the chemical vapor deposition chamber.

As clarified and recited in independent claim 13, the apparatus also comprises chemical vapor deposition chamber having a cavity that includes an inlet nozzle, a throat region and an exit nozzle. The inlet nozzle has a first diameter, and is adapted to receive a carrier fluid including O₂, N₂, and He. The throat region has a second diameter less than the first diameter, and is adapted to receive the carrier fluid from the inlet nozzle and first and second chemical vapor deposition fluids which include precursors and dopants. The exit nozzle has the second diameter of the throat region and is connected to the throat

region such that the exit nozzle is an extension of the throat region, therein the exit nozzle maintaining a second pressure and temperature of the throat region. The exit nozzle is configured to introduce the atomized first and second chemical vapor deposition fluids and the carrier fluid into the chemical vapor deposition chamber

The present invention is further clarified in independent claim 28, whereby it is recited that the apparatus comprises chemical vapor deposition chamber having a cavity whereby this cavity is a cross-flow injector that includes an inlet nozzle, throat region and exit nozzle. The inlet nozzle of the cross-flow injector has a first diameter for receiving a carrier fluid including O₂, N₂, and He. The throat region of the cross-flow injector includes is connected to the inlet nozzle, and has a second diameter less than the first diameter. The throat region is adapted to receive the carrier fluid and a first and second chemical vapor deposition dopants for atomization therein. The exit nozzle of the cross-flow injector is connected to the throat region and receives the atomized first and second chemical vapor deposition dopants and carrier fluid for introduction into the chemical vapor deposition chamber.

Applicants continue to submit that the present invention is not anticipated by Gwyn, as all material elements of the claimed invention are not and cannot be found in the Gwyn patent. Anticipation is but the ultimate or epitome of obviousness. To constitute anticipation, all material elements of a claim must be found in one prior art source. *In re Marshall*, 577 F.2d 301, 198 USPQ 344 (CCPA 1978).

It is again submitted that the Gwyn patent is merely directed to a paint-spraying device for mixing and spraying different colorants utilizing a venturi mixer system. It is not directed to, nor does even suggest, apparatus relating to chemical vapor deposition systems. As disclosed, Gwyn is limited to an apparatus (10) for mixing and spraying different colorants, i.e., paints, dyes and stains, to achieve various color combinations on a target workpiece, particularly, for the application of camouflage paints on military vehicles. (Col. 1, lines 13-20 and col. 2, lines 18-20.) In particular, it is directed to a venturi mixing system (18) for mixing and spraying different colorants.

Gwyn discloses a pressurized air source (12) to supply relatively constant pressure air to the venturi mixer system (18) whereby colorants are drawn into the venturi throat for thorough mixing and subsequent introduction to a spray nozzle. (Col. 1, lines 21-35 and col. 2, lines 20-22.) The venturi mixer (18) has an inlet chamber (17), a throat region (19) and an outlet chamber (21). As pressurized air flows through the venturi throat, colorants are drawn through three separate tubes or liquid lines (20) leading from separate containers (22) for colorant. The mixed colorant then flows from chamber (21) through a hose (26) to a spray gun (28) at a pressure high enough to vaporize the paint. (Fig. 1 and col. 2, lines 18-49.)

Applicants continue to submit that the Gwyn patent does not disclose or teach an apparatus for delivering CVD fluids to a CVD chamber having a cavity, preferably a cross-flow injector, whereby the cavity includes inlet and exit nozzles with a throat region there-between as recited in independent claims 1,

13 and 28. Gwyn is limited to a paint-spraying device for mixing and spraying different colorants utilizing a venturi mixer system. (Fig. 1 and col. 2, lines 18-49.) A spray gun (28) is adapted to receive the mixed colorants of the Gwyn patent, whereas a CVD chamber is adapted to receive atomized CVD dopants/precursors mixed with a carrier fluid in the present invention.

In the above office action, the Examiner states that the present specification fails to define "dopant," and as such, has given such term the broadest reasonable interpretation. Applicants disagree with the Examiner's position as "claims are given their broadest reasonable interpretation consistent with the specification." See, *In re Graves*, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995); *In re Etter*, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985) (en banc). It is submitted that if one were to interpret applicants' claims with respect to the present application, the term dopant would not be interpreted to include the paints, dyes or colorants of the Gwyn patent. The present specification is directed to chemical vapor deposition processes for injection of vapor phase dopants and precursors, i.e., in the atomized and vapor phase, over a substrate or wafer surface within a chemical vapor deposition chamber for formation of a thin film thereon. (Specification, page 1, lines 9-18 and page 3, line 26 to page 4, line 13.) It does not disclose, suggest or contemplate mixing colorants within a venturi mixer system (18) for painting a targeted workpiece, preferably a military vehicle, as is disclosed in Gwyn.

Further, applicants wholly disagree with the Examiner's position that since Gwyn discloses an "inlet nozzle", "throat region" and "exit nozzle", then it too discloses a "chemical vapor deposition chamber having a cavity".

Firstly, applicants disagree with the Examiner's assertion that the term "chamber" in the limitation of a chemical vapor deposition chamber having a cavity" is defined/identified as a separate element than the chamber in the preamble. This is because the preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention. *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434, 54 USPQ2d 1129, 1136-37 (Fed. Cir. 2000).

It is submitted that the bodies of the pending claims define structurally complete inventions, which, are each directed to a CVD chamber each having a cavity, preferably a cross-flow injector. Applicants have clearly recited that it is the cavity, preferably a cross-flow injector as recited in claim 28, that includes an "inlet nozzle", "throat region" and "exit nozzle" –not the CVD chamber. It is for these reasons that the applicants disagree with the Examiner's statement that "[s]ince Gwyn also discloses an "inlet nozzle", "throat region" and "exit nozzle", Gwyn too discloses a "chemical vapor deposition chamber having a cavity". It is submitted that Gwyn does not disclose or contemplate chemical vapor deposition chambers, it is limited to a venturi mixer system for mixing of colorants therein and the introduction of such mixed colorants into a spray paint gun (28). (Col. 1, lines 13-35 and col. 2, lines 18-49 and Fig. 1.)

Applicants also continue to submit that the Gwyn patent does not disclose or contemplate an exit nozzle having the same diameter as the throat region, thereby being an extension of the throat region, as recited in claim 13, nor does it disclose or contemplate a chemical vapor deposition chamber having a cross-flow injector as is recited in claim 28.

Accordingly, applicants continue to submit that the claims of the instant invention include limitations not disclosed nor contemplated by Gwyn such that Gwyn does not anticipate nor render obvious the instant invention.

35 USC 103 Claim Rejections

The Examiner also maintains the rejection of claims 2, 12, 14 under 35 USC 103(a) as being unpatentable over Gwyn (U.S. Patent No. 4,397,422).

As discussed above, Gwyn does not anticipate nor render obvious the instant invention due to limitations in the invention not disclosed in Gwyn as such patent does not disclose or contemplate an apparatus comprising a chemical vapor deposition chamber having a cavity of an inlet and exit nozzle connected by a throat region for mixing atomized first and second CVD dopants with a carrier fluid. Gwyn also does not disclose or contemplate the exit region being an extension of the throat region as recited in claim 13, nor the CVD chamber having a cross-flow injector as recited in claim 28. Again, Gwyn is limited to simple mixing of the colorants within a throat region of a venturi mixer to achieve a final colorant mixture, which, is further mixed in an outlet chamber (21). (Col. 2, lines 18-49 and col. 4, lines 58-60.)

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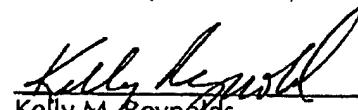
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With respect to claims 2, 12 and 14, the Examiner states that it would have been obvious to one of ordinary skill in the art to alter the inlet and exit nozzle angles for optimization dependent of application criteria. Applicants disagree as Gwyn does not disclose or suggest altering a nozzle angle such that the nozzle is configured to introduce an atomized chemical vapor deposition dopants/precursors and a carrier fluid into a CVD chamber.

It is respectfully submitted that the application has now been brought into a condition where allowance of the case is proper. Reconsideration and issuance of a Notice of Allowance are respectfully solicited. Should the Examiner not find the claims to be allowable, Applicants' attorney respectfully requests that the Examiner call the undersigned to clarify any issue and/or to place the case in condition for allowance.

Respectfully submitted,



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